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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/870,957	05/30/2001	Tomoki Kobayashi	IIW-003	9126
959	7590	11/02/2004	EXAMINER	
LAHIVE & COCKFIELD, LLP. 28 STATE STREET BOSTON, MA 02109			CREPEAU, JONATHAN	
			ART UNIT	PAPER NUMBER
			1746	

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/870,957

Applicant(s)

KOBAYASHI ET AL.

Examiner

Jonathan S. Crepeau

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 July 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,11-15,17,19,21-26,31,34,35 and 38-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 39 is/are allowed.
- 6) ☒ Claim(s) 1,2,11-13,15,17,19,22-26,31,34,35,38,40 and 43 is/are rejected.
- 7) ☒ Claim(s) 14,21,41 and 42 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1, 2, 11-15, 17, 19, 21-26, 31, 34, 35, and newly added claims 38-42. The 35 USC §112, first paragraph rejection of claims 23-25 has been withdrawn as Applicant's argument is persuasive. Applicant's filing of a translation of priority document 2000-160098 is sufficient to remove JP 2000-195533 as prior art. Regarding the claims, claim 39 is allowed and claims 14, 21, 34, 35, 41, and 42 contain allowable subject matter. Certain ones of claims 1, 2, 11-13, 15, 17, 19, 22-26, 31, 38, 40, and 43 remain rejected for substantially the reasons of record and certain others are newly rejected as necessitated by amendment. Accordingly, this action is made final.

Claim Objections

2. Claims 31, 34, and 38 are objected to because of the following informalities: in line 2 of claims 31 and 34, "step" should be "steps"; in claim 38, line 6, "an the exhaust gas" should be "the exhaust gas". Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 34 and 35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The last line of the claim recites the step of "increasing the temperature of the compressed exhaust gas exceeds a predetermined level." This does not make sense and the scope thereof cannot be ascertained. It is suggested that the original language (i.e., the pressure control valve) be restored.

Claim Rejections - 35 USC § 102

5. Claims 1, 2, 23, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 58-164157. Regarding claims 1, 23, and 26, the reference is directed to an apparatus comprising a fuel cell (2) (see Fig. 2). Supply gas (7) is supplied to the fuel cell and exhaust gas (8) is discharged therefrom. The apparatus comprises means for returning the exhaust gas to the supply gas (i.e., valve 11; see abstract). Regarding claims 2, 23, and 26, the valve is controlled by a controller (13) responsive to the exhaust gas temperature (12) (e.g., the hot exhaust gas is recirculated when the fuel cell is below a prescribed temperature). Regarding claim 1, this exhaust gas temperature corresponds to a "warming-up condition" of the fuel cell. Regarding claim 26, the valve may also be controlled in response to the inlet temperature of the air (see abstract). Regarding claims 1, 23, and 26, the apparatus is capable of being operated at a starting up time of the fuel cell.

Thus, the instant claims are anticipated.

Claim Rejections - 35 USC § 103

6. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 58-164157.

JP '157 is applied to claims 1, 2, 23, and 26 for the reasons stated above.

However, the reference does not expressly teach that the supply gas is humidified, as recited in claim 22.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to humidify the supply gas of JP '157. Water optimization is recognized as an important issue in fuel cell operation, and accordingly, the artisan would be motivated to appropriately humidify the supply gas of JP '157.

7. Claims 11-13, 15, 17, 19, 24, 25, 31, 38, 40, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 58-164157 in view of Strasser (U.S. Patent 5,543,238).

JP '157 is applied to claims 1, 2, 23, and 26 for the reasons stated above. While Figure 2 of JP '157 teaches blower 10 in the air recirculation line (and blower 7 in the air intake line), the abstract and text of JP '157 does not expressly disclose that element 10 is a compressor, as recited in claim 13.

Strasser is directed to a fuel cell recirculation system. The air intake and recirculation lines contain compressors (26, 36). Regarding claim 19, the ratio of fresh air to recycled air is adjusted to maintain a specific oxygen level at the cathode-side supply (see col. 5, line 32 et seq.)

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use compressors as elements 7 and 10 of JP '157. Pressurized reactants are known to be beneficial to fuel cell performance. See Strasser at col. 4, line 41 ("the static air pressure being approximately 1.3-4 bar in the exemplary embodiment"). Thus, the artisan would be motivated to use compressors as elements 7 and 10 of JP '157. Such compressors would also function adiabatically and raise the temperature of the gas. Regarding claim 19, which recites that fresh air is taken to replenish oxygen during power generation, this would be an obvious manner of operating the system of JP '157, as shown by Strasser. When the load becomes high or the oxygen concentration to the fuel cell is decreased, it would be obvious to supply more fresh air to the fuel cell, which has a higher concentration of oxygen than the recycled air. A controller to perform this function (as recited in claim 11) would also be an obvious addition.

Regarding the recitation in claims 13, 24, and 25 that all of the exhaust gas is returned to the compressor (or supply gas) during a warming-up (starting up) period, this limitation would be rendered obvious by the disclosure of JP '157. The purpose of the invention of JP '157 is to keep the outlet temperature of air within predefined limits. Upon starting the fuel cell, it would be obvious to recirculate all the hotter exhaust air and mix it with the incoming cooler air until the temperature of the exhaust air is stabilized. Furthermore, regarding claims 15 and 17, the controller would "know" when warming-up has finished because the temperature would reach a

predefined lower limit. At that point, the controller would temporarily stop the recirculation, as recited in claim 24. Accordingly, the subject matter of claims 13, 15, 17, 24, and 25 would be rendered obvious to a skilled artisan.

The JP '157 reference further does not expressly teach the steps of measuring the temperature of the supply gas when the temperature of the exhaust gas is lower than a predetermined level, as recited in claims 31 and 38.

However, the artisan would be motivated to use a control scheme in JP '157 wherein both the supply and exhaust temperatures are measured until both measurements are above threshold values. During startup, such a control scheme would ensure the complete warming up of the system. Accordingly, the claimed step of measuring the temperature of the supply gas when the temperature of the exhaust gas is lower than a predetermined level is considered to be obvious to a skilled artisan.

Regarding the pressure control valve recited in claim 38, such a valve (11) is present in JP '157. However, claim 38 does not specify *when* the valve opening is decreased. As such, claim 38 is considered to be met by the JP '157 and Strasser references.

Regarding claim 31, which recites that the exhaust gas temperature is increased if the temperature of the supply gas is lower than a predetermined level, this limitation is also obvious over JP '157 and Strasser. The artisan would be motivated to increase the rotational speed of the recycle compressor so as to produce a hotter gas and shorten the warm-up time. Note that the rejection of claim 31 was necessitated by the deletion of the "pressure control valve" limitation. Accordingly, reinsertion of this limitation is suggested.

Regarding claim 40, a “negative pressure” in the fuel cell would be created in the circumstance that the recycle compressor was operated at a high rotational speed. As such, claim 40 is also not considered to distinguish over the references.

Response to Arguments

8. Applicant's arguments filed July 6, 2004 have been fully considered but they are not persuasive insofar as they apply to the present rejections. Regarding the JP '157 reference, Applicants assert that that the reference provides for the “cooling down” of the fuel cell using a controlling valve, in contrast to the claimed invention, which provides for the warming up of a fuel cell. However, it is noted that the cooling effect obtained by JP '157 is from using a fresh air input. As set forth above, the recirculated air is hot, and thus the valve (11) does in fact function to “warm up” the fuel cell when the measured temperatures are below threshold levels. On page 3 of the translation, the reference teaches that “[c]ontroller 13 controls the mixing ratio of fresh air to recirculating air so that the output temperature of air chamber 6 becomes an optimal temperature as a whole. In this case, as the inlet temperature of the air chamber also needs to be set with a predetermined temperature range so as to achieve a sufficient operation for the fuel cell, it is preferably detected as needed so as to control control valve 11 so that both inlet and outlet temperatures fall into a desired temperature range.” As such, it is seen that the operation of the system involves using the recirculated gas to heat the fuel cell, as recited in the rejected claims.

Allowable Subject Matter

9. Claim 39 is allowed.
10. Claims 34 and 35 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.
11. Claims 14, 21, 41, and 42 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
12. The following is a statement of reasons for the indication of allowable subject matter:
Claims 34, 35, and 39 contain allowable subject matter for the reasons previously set forth.

Regarding claims 14, 21, 41, and 42, it would not be obvious to incorporate a heat exchanger in the system of JP '157. On page 3, second and third full paragraphs, the reference teaches that one of the objects of the invention is to eliminate heat exchangers. As such, claims 14, 21, 41, and 42 contain allowable subject matter.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

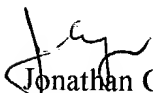
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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr, can be reached at (571) 272-1414. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jonathan Crepeau
Primary Examiner
Art Unit 1746
October 29, 2004